



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/981,390	10/18/2001	Yuichi Naitou	NEC-472-US	7712

466 7590 08/05/2003

YOUNG & THOMPSON
745 SOUTH 23RD STREET 2ND FLOOR
ARLINGTON, VA 22202

EXAMINER

JOHNSTON, PHILLIP A

ART UNIT	PAPER NUMBER
----------	--------------

2881

DATE MAILED: 08/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/981,390

Applicant(s)

NAITOU ET AL.

Examiner

Phillip A Johnston

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-7,9-11,13-35,43-51 and 55-78 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

- 5) ☐ Claim(s) _____ is/are allowed.

- 6) ☒ Claim(s) 5-7,9-11,14-35,43-51 and 55-78 is/are rejected.

- 7) ☒ Claim(s) 13 is/are objected to.

- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

D tailed Action

Examiners Response to Arguments

Claims Objection

1. Claim 13 is objected to as being dependent upon canceled Claim 12.

Claims Rejection – 35 U.S.C. 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 5-7, and 9-11 stand rejected as being clearly anticipated by U.S. Patent No. 5,990,477, to Tomita.

Regarding amended Claim 5, Tomita (477) discloses a scanning probe microscope having a probe equipped with a probe tip at its front end, a vibration application portion consisting of a piezoelectric vibrating body and an AC voltage-

generating means, a vibration-detecting portion consisting of a quartz oscillator and a current/voltage amplifier circuit, a coarse displacement means for bringing the probe close to a surface of a sample, a sample-to-probe distance control means consisting of a Z fine displacement element and a Z servo circuit, a two-dimensional scanning means consisting of an XY fine displacement element and an XY scanning circuit, and a data-processing means for converting a measurement signal into a three-dimensional image. This is characterized in that the probe is held to the quartz oscillator by spring pressure of a resilient body. Because of this structure, an apparatus for machining, recording, and reproducing is provided, using the scanning probe microscope, the apparatus being characterized in that it can measure surface topography with good reproducibility, have good machining accuracy and recording accuracy, and can easily reproduce information. See Column 3, line1-20.

4. Applicants arguments are moot in view of new grounds for rejection.

Claims Rejection – 35 U.S.C. 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 2881

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Amended Claims 14-35, 43-51 and 55-78 are rejected under 35 U.S.C.

103(a) as being unpatentable over U.S. Patent No. 5,990,477, to Tomita, in view of Adderton et al, U.S. Patent No. 6,172,506, and in further view of Williams et al, U.S. Patent No. 6,210,982.

Tomita (477) in view of Adderton (506), discloses a scanning probe microscope apparatus and method that includes nearly all the limitations of amended Claims 14-35, 43-51 and 55-78, but does not disclose "a voltage applying unit for applying an AC voltage to the sample". Williams (982); however, discloses a method that can also be applied to data obtained from the Scanning Probe Microscope when it is operating in a mode wherein the AC bias voltage applied to the substrate is held constant and the signal is the change in depletion capacitance.

In step one of this alternative embodiment, the tip of the probe is scanned over the two-dimensional surface of the substrate material being probed. This scanning is executed in accordance with the constant AC bias voltage mode, in contrast to the constant capacitance mode.

The second step is to take measurements of the change in capacitance. This is done to obtain a corresponding probe capacitance signal. The change in capacitance measurements are recorded as a function of the position of the probe on the surface of the substrate.

These first two steps are executed to thereby experimentally acquire change-in-capacitance data to be input into a first order model, which assumes

uniform dopant density under the probe at each point on the substrate material.

See Column 7, line 19-38.

Therefore it would have been obvious to one of ordinary skill in the art that the scanning probe microscope of Tomita (477) in view of Adderton (506), can be modified to apply an AC bias voltage to the sample in accordance with Williams (982) to improve the accuracy of dopant density profiling in semiconductor substrates.

Conclusion

7. The Amendment filed on 5-13-2003 has been considered but the arguments are moot in view of new grounds for rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip A Johnston whose telephone number is 305 7022. The examiner can normally be reached on 7:30 to 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 703 308 4116. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9318 for regular communications and 703 872 9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.


JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

PJ

July 16, 2003